

CLAIMS:

1. An apparatus for delivering food product to a means for cutting in a substantially horizontal plane through the product, the apparatus comprising:

a passage extending downwardly toward the cutting means and defining an opening in proximity to the cutting means;
guide means disposed along a first portion of the passage and oriented substantially parallel to the passage; and
means for applying a force on a product traveling downward through the passage so as to urge the product into contact with the guide means during engagement with the cutting means.

2. An apparatus according to claim 1, wherein the passage is defined by a tubular member, the first portion of the passage is a first wall portion of the tubular member, and the applying means are located at an oppositely-disposed second wall portion of the tubular member.

3. An apparatus according to claim 1, wherein the applying means comprises at least two fluid jets flowing across the passage toward the first portion so as to impact the product as the product travels downward through the passage.

4. An apparatus according to claim 3, wherein the at least two fluid jets are coplanar and converge toward the first portion of the passage.

FOOD PROCESSING EQUIPMENT

5. An apparatus according to claim 3, wherein the at least two fluid jets are disposed at an angle relative to each other of greater than 0 degrees and less than 180 degrees.
6. An apparatus according to claim 3, wherein the at least two fluid jets intersect at the first portion of the passage.
7. An apparatus according to claim 3, wherein each of the at least two fluid jets flows in a downward direction at an angle of about 0 degrees to less than 90 degrees from horizontal.
8. An apparatus according to claim 1, wherein the passage is disposed at an angle of about 90 degrees to the plane of the cutting means.
9. An apparatus according to claim 1, wherein the cutting means comprises a hub at a vertical axis of rotation of the cutting means, and blades extending radially from the hub.
10. An apparatus according to claim 1, wherein the blades having cutting edges that produce a crinkled or V-slice cut through the product.
11. An apparatus according to claim 1, further comprising means for delivering an elongate product to the passage, the delivering means being operable to separate and longitudinally align the elongate

A1-1431

product with the passage so that the elongate product enter and travel through the passage with a longitudinal axis of the elongate product substantially parallel to the passage.

204008-020420242024

12. An apparatus for delivering elongate food product to a cutting means having a substantially horizontal cutting plane, the apparatus comprising:

means for defining a substantially vertical passage, the defining means comprising a wall portion, a second portion spaced apart from the wall portion by the passage, and an opening in proximity to the cutting means;

splines disposed on the wall portion and oriented substantially parallel to the passage;

at least a first set of at least two fluid jets flowing in a downward direction across the passage from the second portion of the passage toward the wall portion, the fluid jets converging toward the first wall portion to apply a force on a product traveling downward through the passage and maintain the product in contact with the splines during engagement with the cutting means; and

means for delivering the product to the passage, the delivering means being operable to separate and longitudinally align the product with the passage so that the product enters and travels through the passage with a longitudinal axis of the product substantially parallel to the passage.

13. An apparatus according to claim 12, wherein the defining means is a tubular member, the wall portion of the passage is a first wall portion of the tubular member, the second portion of the passage is a second wall portion of the tubular member diametrically opposite the first wall portion, and the fluid jets are emitted from nozzles located in the second wall portion.

F002507-002508

14. An apparatus according to claim 12, further comprising at least a second set of at least two fluid jets flowing in a downward direction across the passage from the second portion of the passage toward the wall portion, the second set of fluid jets converging toward the first wall portion to apply a force on the product traveling downward through the passage, the second set of fluid jets being located above the first set of fluid jets within the passage.

15. An apparatus according to claim 14, wherein the first set of fluid jets are substantially coplanar and disposed at an angle relative to each other of up to about 90 degrees, the second set of fluid jets are substantially coplanar and disposed at an angle relative to each other of up to about 90 degrees, and each of the fluid jets flows in a downward direction at an angle of up to about 45 degrees from horizontal.

16. An apparatus according to claim 14, wherein the fluid jets of at least one of the first and second sets intersect at the wall portion of the passage.

17. An apparatus according to claim 12, wherein the passage is disposed at an angle of about 90 degrees to the cutting means.

18. An apparatus according to claim 12, wherein the cutting means comprises a hub at a vertical axis of rotation of the cutting means, and blades extending radially from the hub.

19. An apparatus according to claim 18, wherein each blade of the cutting means passes beneath the opening in a direction away from the second portion of the passage and toward the wall portion of the passage, the wall portion has an exit point at which each of the blades leaves the opening, and the fluid jets intersect directly above the exit point of the wall portion.
20. An apparatus according to claim 18, wherein the blades produce a crinkle or V-slice cut through the product.

SEARCHED - INDEXED - SERIALIZED - FILED

W. Spline

21. A method of delivering food product to a means for cutting in a substantially horizontal plane through the product, the method comprising the steps of:

providing a passage extending downwardly toward the cutting means and defining an opening in proximity to the cutting means, the passage comprising guide means disposed along a first portion of the passage and oriented substantially parallel to the passage; and

applying a force on a product traveling downward through the passage so as to urge the product into contact with the guide means during engagement with the cutting means.

22. A method according to claim 21, wherein the passage is defined by a tubular member, the first portion of the passage is a first wall portion of the tubular member, and the force is applied from an oppositely-disposed second wall portion of the tubular member.

23. A method according to claim 21, wherein the force is applied by at least two fluid jets flowing across the passage toward the first portion so as to impact the product as the product travels downward through the passage.

24. A method according to claim 23, wherein the at least two fluid jets are coplanar and converge toward the first portion of the passage.

25. A method according to claim 23, wherein the at least two

fluid jets are disposed at an angle relative to each other of greater than 0 degrees and less than 180 degrees.

26. A method according to claim 23, wherein the at least two fluid jets intersect at the first portion of the passage.

27. A method according to claim 23, wherein each of the at least two fluid jets flows in a downward direction at an angle of about 0 degrees to less than 90 degrees from horizontal.

28. A method according to claim 21, wherein the passage is disposed at an angle of about 90 degrees to the cutting means so that the product travels in a direction substantially perpendicular to the cutting means.

29. A method according to claim 21, wherein the cutting means rotates about a vertical axis and comprises a hub at the vertical axis and blades extending radially from the hub.

30. A method according to claim 29, wherein the blades produce a crinkle or V-slice cut through the product.

31. A method according to claim 21, further comprising the step of delivering an elongate product to the passage so that elongate product are separated and longitudinally aligned with the passage so that the elongate product enter and travel through the passage with a longitudinal axis of the

A1-1431

elongate product substantially parallel to the passage.

100024494 " Q3 Q4 Q5

32. A method of delivering elongate food product to a cutting means having a substantially horizontal cutting plane, the method comprising the steps of:

providing a substantially vertical passage defined by a wall portion, a second portion spaced apart from the wall portion by the passage, and an opening in proximity to the cutting means, the wall portion having splines extending therefrom and oriented substantially parallel to the passage;

delivering elongate product to the passage so that the elongate product are separated and longitudinally aligned with the passage so that the elongate product enters and travels through the passage with a longitudinal axis of the elongate product substantially parallel to the passage; and

flowing at least a first set of at least two fluid jets in a downward direction across the passage from the second portion of the passage toward the wall portion, the fluid jets converging toward the first wall portion to apply a force on a product traveling downward through the passage and maintain the product in contact with the splines during engagement with the cutting means.

33. A method according to claim 32, wherein the defining means is a tubular member, the wall portion of the passage is a first wall portion of the tubular member, the second portion of the passage is a second wall portion of the tubular member diametrically opposing the first wall portion, and the fluid jets are emitted from nozzles located at the second wall portion.

- TOP SECRET//
INT'L//
REF ID: A1-1431
34. A method according to claim 32, wherein at least a second set of at least two fluid jets flow across the passage toward the wall portion so as to impact the product as the product travels downward through the passage, the second set of fluid jets being located above the first set of fluid jets within the passage.
35. A method according to claim 34, wherein the first set of fluid jets are substantially coplanar and disposed at an angle relative to each other of up to about 90 degrees, the second set of fluid jets are substantially coplanar and disposed at an angle relative to each other of up to about 90 degrees, and each of the fluid jets flows in a downward direction at an angle of up to about 45 degrees from horizontal.
36. A method according to claim 34, wherein the fluid jets of at least one of the first and second sets intersect at the wall portion of the passage.
37. A method according to claim 32, wherein the passage is disposed at an angle of about 90 degrees to the cutting means so that the product travels in a direction substantially perpendicular to the cutting means.
38. A method according to claim 32, wherein the cutting means rotates about a vertical axis and comprises a hub at the vertical axis and blades extending radially from the hub.

39. A method according to claim 38, wherein each blade of the cutting means passes beneath the opening in a direction away from the second portion of the passage and toward the wall portion of the passage, the wall portion has an exit point at which each of the blades leaves the opening, and the fluid jets intersect directly above the exit point of the wall portion.

40. A method according to claim 38, wherein the blades produce a crinkle or V-slice cut through the product.

SEARCHED INDEXED
SERIALIZED FILED
APR 22 1992